

INTRODUCTION

Chapter ONE

Knowledge is an important ingredient in the achievement of economic progress. In the present era of rapid technological change and globalization, knowledge is considered to be one of the key determinants of economic competitiveness and prosperity of nations. This is reflected in the fact that countries around the world are now scrambling to formulate and implement plans and policies to achieve an economic structure that is commonly known as a “knowledge-based economy” (K-economy).

Central to the notion of the K-Economy is the creation, diffusion, and application of knowledge in such a way that will enhance economic growth and development. These dynamic processes are aspects of technological innovation. Thus, technological innovation is at the heart of the K-Economy. In the quest for a K-Economy, the right question for policy makers to ask is therefore: what are the conditions that are conducive to technological innovation? In order to answer this question, policy makers will need a good understanding of the knowledge base and capabilities of firms and the environment within which they operate.¹ The purpose of a national innovation survey is to meet such needs. A national innovation survey collects data on the state of technological innovation in a given country during a given time period. Such information are crucial inputs into national innovation policies. These policies are aimed at strengthening the knowledge base of an economy (science and technology policy) or innovation at the firm and industry level (industrial policy).

Systematic survey of innovation at the national level began with the publication of the *Oslo Manual* in 1992 by the Organization for Economic

Co-operation and Development (OECD) and the European Commission (EC). A revised version of the manual was subsequently published in 1997. The Oslo Manual provides guidelines on data collection on technological innovation. Following its publication and revision, the EC countries carried out two waves of national innovation surveys (*Community Innovation Surveys* (CIS)) – the first in the early 1990s and the second in the late 1990s. At the moment, most of the EC countries are at the early stage of preparation for the third wave of their respective national innovation survey.

The first national survey of innovation (NIS-1) in Malaysia was carried out in 1995 covering a five-year period between 1990 and 1994 (MASTIC, 1996). This report presents findings from the second national survey of innovation (NIS-2).² The reference period for the NIS-2 is 1997-1999. Some 4,000 firms in the manufacturing sector were surveyed in NIS-2.

New Features of the Survey

The second national survey of innovation (NIS-2) is different from the first national survey of innovation (NIS-1) in several key aspects:

1. Sampling Methodology

The NIS-2 employs a sampling methodology that is significantly different from that of NIS-1. In the NIS-1, a list of 815 companies were a-priori identified as possible innovators from various sources of information including MASTIC (R&D survey), SIRIM (ISO 9000 recipients), MITI (R&D

¹ *This set of institutions and the flow of knowledge that takes place between them is collectively known as the National Innovation System.*

² *Both surveys were carried out by the Malaysian Science and Technology Information Centre (MASTIC), Ministry of Science, Technology and Environment, Malaysia.*

incentives recipients), and Technology Park Malaysia (tenants).

In line with the recommendations of the Oslo Manual, the NIS-2 adopted a stratified random sampling approach. The population frame for the survey was obtained from the Department of Statistics. A list comprising 20,584 firms in the manufacturing sector was used for sampling in the NIS-2.

2. Sample Size

The NIS-2 has a larger sample size compared to the NIS-1. 815 questionnaires were sent out in NIS-1. Of these, 412 firms responded. A total of 270 firms indicated that they carry out innovation activities.

The NIS-2 was carried out in two stages:

- (a) In the first stage 4,000 questionnaires were sent to firms in the manufacturing sector.
- (b) In the second stage, firms that indicated that they carried out innovation activities in the first stage survey were sent more detailed questionnaires.

3. Questionnaire Design

For the NIS-2, the design of the detailed questionnaires was based on recommendations from the Oslo Manual as well as the questionnaires used in the *Second Community Innovation Surveys* (CIS-2).

4. Reference Period

The NIS-1 adopted a five-year reference period. For the NIS-2 a three-year reference period was adopted (1997-99). This is consistent with recommendations from the Oslo Manual as well as current practices (CIS-2).

Outline of the Report

The NIS-2 report is organized in the following manner. Chapter 1 provides an introduction to the report. In Chapter 2, the methodology adopted is discussed. The overall characteristics of the survey sample are discussed in Chapter 3. Chapter 4 focuses on innovation in the manufacturing sector. Chapter 5 provides an international perspective on innovation activities. Tables are placed in the appendices.